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THE PROFITABILITY OF A BIRTHING CENTER

A COST FINDING ANALYSIS OF A NOT-FOR-PROFIT HOSPITAL

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LTJG THOMAS C. HUGHES, CHE

MEDICAL SERVICE CORPS, UNITED STATES NAVY

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ABSTRACT

Since the implementation of prospective payment methodologies, hospitals have seen their revenues dwindle. Many are offering significant discounts to attract price-sensitive buyers. Hospitals are realizing the importance of quantifying operations and management decisions. Cost finding, through cost accounting techniques, is a method hospitals employ to evaluate the adequacy of reimbursement, product line performance, organizational performance, management effectiveness, and future viability. This paper reports the process and findings of a cost finding analysis at a not-for-profit (NFP) hospital's Birthing Center. Two research questions were explored: (1) What are the marginal costs of providing care in the Maternity product line (PL)? and, (2) Which third party payers provide the highest contributing margin? The scope of this analysis was a five year time-frame. The different categories of costs were discussed, as well as cost finding approaches. The adequacy of full-cost information for use by PL managers, especially for short-term decision making, was also explored. The results of this analysis provided information regarding the categories of patients and the types of third party payers that had the highest contributing margin in fiscal year 1996. Recommendations were provided to the leadership of Newport Hospital regarding enhancing marketing efforts, establishing case-mix management practices, improving management information systems, evaluating the hospital's capacity versus current patient demand, and, establishing a Business Plan for the Birthing Center.

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INTRODUCTION

Since the arrival of the prospective payment system (PPS) in 1983, hospitals have seen their revenues dwindle. Many are offering significant discounts to attract price-sensitive buyers and agreeing to limit future price increases (Cleverly 1994). Additionally, restrictions on admitting, length of stay, and reimbursements are placing hospitals on the defensive. No longer are hospitals assured that payers will reimburse for care at a level that will cover the cost to provide that care.

Today, for profit (FP) and not-for-profit (NFP) hospitals alike are realizing the importance of quantifying operations and management decisions. Before PPS, it was not as essential for hospitals to quantify operations or attempt to find the "true cost" of providing care, since reimbursement was based on charges submitted. Since PPS, it has become extremely important for hospitals to know whether their costs were more or less than the fixed payments they received from third party payers.

Cost finding, through cost accounting techniques, is a method hospitals employ to evaluate the adequacy of reimbursement, product line performance, organizational performance, management effectiveness, and future viability. Accurate cost accounting is imperative in today's tumultuous healthcare arena. Healthcare administrators need accurate and relevant financial information on which to base routine and non-routine decisions. No longer can a new service,

capital investment or restructuring be undertaken without first considering the relevant financial implications.

Newport Hospital, located in southern Rhode Island, is a 200 bed NFP hospital that provides services to most of the 87,194 residents of Newport County. The hospital itself falls under a NFP parent corporation. The corporation's other subsidiaries perform fund-raising and fund-management, property and real estate investing, group practice development, and business pursuits unrelated to its NFP status. The facility has been in operation since 1873 and pursues a charitable mission, "To maximize the health status of all the people of Newport County."

Besides operating revenues, Newport Hospital has several sources of non-operating revenues, which are divided into restricted and unrestricted accounts. Newport's restricted funds, or endowments, were created by gifts and bequests from donors. These funds are "pure endowments," meaning that the principal sum cannot be expended. The use of the income from these funds however, is dependent upon the terms and conditions of the gift. Newport's unrestricted funds include Plant Replacement/Expansion and Specific Purpose Funds. These funds consist primarily of invested assets set aside by the prudent actions of Newport Hospital's Board of Trustees. In recent years, unrestricted funds were used for renovations and to repay the principal on long-term debt.

In July of 1996, the combined dollar value of restricted and unrestricted funds totaled ninety-seven million dollars. The fifteen year average return on investment that Newport received from the two funds was fifteen percent. Newport Hospital relies little on debt financing (approximately $530,000 -- at six

percent interest), which makes careful management of its non-operating revenues very important.

Newport Hospital generates operating revenues from three major sources, or product-lines (PL). The three PLs are inpatient maternity, inpatient psychiatry and inpatient rehabilitation. Medicare, Blue Cross and Health Maintenance Organizations (HMOs) were the top three sources of third party revenues, and made-up 77 percent of all operating revenues in fiscal year 1996.

Operating charges for 1996 totaled $69,555,105. Of that total, $20,118,926 was subtracted due to contractual allowances, indigent care and bad debt write-offs. An additional $3,326,764 was earned through ancillary activities (cafeteria, endowments earmarked for indigent patients, sale of medical records, etc.). Therefore, $51,762,943 was the net operating revenues. Operating expenses equaled $52,555,845 during the same period. And, fiscal year 1997 operating expenses are projected to exceed operating revenues by $1,200,000.

Statement of the Problem

Due in large part to the amount of uncompensated indigent care that Newport provided ($3,796,276 in FY 1996), and the continued restrictions placed on third party revenues, the problem was that Newport's operating expenses consistently exceeded operating revenues. To compensate for the shortfall in operating revenues, Newport turned to revenues produced by its endowments.

Purpose

Solovy (1989) writes that under pressure by the increase in prospective pricing systems and managed care arrangements, patient-service revenues are a function of utilization by separate classes of patients. In that vein, this analysis was requested by the Chief Executive Officer (CEO) of Newport, to evaluate current operations, the adequacy of reimbursement from the current payer mix, and, to obtain information for use in future managed care contract negotiations.

The purpose of this analysis was to evaluate Newport Hospital's maternity PL. Expenses, revenues and payer mix were examined. The goal of the analysis was to determine whether the PL contributes to the hospital's bottom line or if corrective action was necessary. The basis of the entire analysis was cost accounting.

Research Question

The research questions were "What are the marginal costs of providing care in the Maternity PL?" And "Which third party payers provide the highest contributing margin?" Based on the results, the leadership can use the information obtained by this analysis to consider: (1) reengineering processes, (2) downsizing (rightsizing), (3) reorganization, (4) renegotiating contracts, (5) changing the payer mix, (6) changing pricing policies, or, (7) some combination of the previous.

LITERATURE REVIEW

The literature was rich with discussion of cost accounting and cost finding approaches (Holmes 1996) and managing payer mix (McCormick 1991). Adopting certain industry cost finding approaches and modifying them for use within the healthcare arena have also been discussed (Pelfrey 1995 and Chan 1993). This literature review focused on defining cost accounting, describing the various types of costs, the adequacy of cost accounting systems, and using relevant cost information to make sound business decisions. Overall, the literature validates the methodology used in undertaking this financial analysis.

Cost Accounting

Cost accounting is a process of identifying resources consumed in the production/provision of goods and services and the corresponding costs of those resources (Finkler 1994). Once costs are determined, an organization can determine and evaluate the efficiency of operations and its pricing strategy.

Cost accounting encompasses the area of managerial accounting, which focuses on providing financial information to internal stakeholders. Cost accounting does overlap into the area of financial accounting, which is primarily focused on providing financial information to external agencies and stakeholders. Certain researchers have focused on problems associated with cost accounting, including past budgetary practices and the difficulties in defining the product of healthcare delivery (Machado 1990).

Cost accounting information is useful to managers in a number of areas. Finkler (1994) notes that managers can use cost accounting information for the management of department-level costs, for pricing decisions in negotiations with managed care organizations, for purposes of strategic planning, and for performing a profitability analysis. Cost accounting involves numerous types of costs, which will be addressed in the following sections.

Cost Object

Before beginning to measure costs, the cost objective must be defined. A cost objective is any particular product or service for which we wish to know its production costs. It may be a specific patient, a class of patients, a service, a department, or an entire organization (Finkler 1994). Carefully defining the cost object is extremely important, but difficult in healthcare.

In the business world, a product is a physical good, place, service, organization, or idea that is offered to consumers for purchase, attention, or consumption to fill a want or need (Kotler 1994). These products are tangible and perishable, and the quality varies from one time to another. They can be inspected or evaluated by the customer before purchase is made (France and Gover 1992). Healthcare is different. Services provided do not always have a clear beginning or a clear end. It is the most intangible of all services. Historically, this dilemma made cost finding a challenge. However, defining the product or service by PL may help resolve this dilemma.

Product Lines in Healthcare

In response to limited healthcare resources, the growing complexity of relationships between suppliers, payers, regulators, employees, and consumers, and a highly competitive environment, many hospitals are restructuring around PLs. A PL consists of a group of related products or services. PLs have been based on medical specialization, clinical service, the international classification of disease codes (ICD-9-CM), and diagnostic related groups (DRGs). PL management involves managers who take responsibility for assessing the future of their PLs, and for developing long-term goals and effective strategies for reaching those goals (Folger and Gee 1987).

PL management breaks down facility services into separate and operating profit or cost centers (ASHA 1991). Nackel and Kues (1986) have written about PL management and discussed the importance of defining PL costs and determining PL profitability by type of service, payer and physician. PL management facilitates a healthcare organization's efforts in identifying the costs associated with a product or service (ASHA 1991). Although originating in the manufacturing sector, healthcare administrators are testing PL management's viability in the healthcare arena,

Direct and Indirect Costs

Two types of costs associated with a PL are direct costs and indirect costs. Direct costs are those clearly associated with the cost object and will appear whenever there is production. Accountants speak of the direct cost per unit when

referring to those costs that can be directly attributed to the production unit of a given product, such as medical supplies and labor. Direct costs are generally under the control of the manager who has overall responsibility for the cost objective. Theoretically, if a PL was eliminated, the direct costs associated with it would also be eliminated in the long-run.

Indirect costs are those not directly associated with a cost object and are usually not within the control of the PL manager. Indirect costs are generally allocated to a PL based on some methodology that estimates its "fair share" of overhead. An example of an indirect cost would be the heating costs of a hospital. In general, indirect costs would be present even if the product or service were eliminated.

Full-Cost Information

The full-cost of a cost object includes both direct costs and an allocated fair share of indirect costs (Finkler 1994). A consensus exits in the literature regarding the inadequacy of using full-cost data in making sound business decisions.

The main reason why full-cost information is inadequate is due to the arbitrary methods used to allocate indirect costs, in which there exists no cause-and-effect relationship. Additionally, using full-cost information to decide upon changing services, adding services, or eliminating services could lead to an inaccurate decision, since certain costs will be present no matter what course of action a manager decides upon. Using full-cost information to evaluate the

impact of increases in patient volume will overstate the increases in costs. So why collect and monitor full-cost information?

Heshmat (1991) writes that full-cost information does serve a purpose in the long-run. The author notes that full-cost information is used for pricing decisions in hospitals. Other authors (Goldschmidt and Gafni 1990) note that using cost information that includes allocated indirect costs is required so the organization is aware of the full-cost of providing a product or services. But for certain management decisions, a careful dissection of an organization's costs is necessary.

Fixed versus Variable Costs

Costs can also be defined by how they behave in relation to volume. Numerous authors cite the importance of separating fixed and variable costs, to make pricing and volume decisions and for flexible budgeting (Pelfrey 1995 and Cleverly 1987). Variable costs are those that vary proportionately to changes in volume. Declining profit margins, competition and excess capacity have healthcare administrators basing many of their pricing strategies solely on variable costs.

Fixed costs are a consequence of the structure of the organization and are allocated through methods such as step-down to the products or services produced. Step-down allocation involves cost-centers distributing their costs to revenue and/or cost centers, one at a time, until all their costs are accounted for (Finkler 1994). An example of a fixed cost would be salaried employees.

Step-fixed costs are those costs that are fixed over a particular range. Once the range is exceeded, the costs change. Nursing labor is an example of a step-fixed cost. Once the census on a ward reaches a certain point, more nurses will be added to the ward. Mixed costs have both a fixed and a variable component within them.

Margrif (1991) explains that allocation of a fixed expense to a PL is often the result of a mandated cost reimbursement methodology or arbitrary external reporting process that has no benefit to internal managers. Thus, separating fixed and variable costs into cost pools results in a clearer picture of the value of a product or service. Research has been done regarding separating fixed and variable costs, which can be accomplished empirically (e.g., regression analysis) or by expert opinion (Eltair and Keen 1994).

Under full-costing, the unit product cost includes fixed as well as variable overhead. The amount of fixed overhead in the product cost depends on: (1) the total amount of fixed overhead, (2) the various bases used to allocate overhead costs, and (3) the expected volume (Heshmat 1991).

Supporting Services versus Overhead Activities

In discussing overhead costs, it is important to distinguish between support services and overhead activities. Support services are those that provide measurable services to other units in an organization so there is a traceable, cause-and-effect relationship between the provider and user of the service. Pharmacy and laboratory departments are examples of support services, provided there is an

adequate audit trail to trace costs back to the responsible center (Goldschmidt and Gafni 1990).

Overhead activities are specific activities that do not have a traceable, cause-and-effect relationship with other units because there is not a direct way to measure the consumption of the overhead activity's output (Goldschmidt and Gafni 1990). The Accounting department within a hospital is an example of an overhead activity. Using a full-costing approach, overhead costs are distributed throughout the organization through allocation.

The goal of cost allocation is to associate costs as closely as possible with the patients who caused them. The allocation process begins with the determination of a suitable allocation or activity base for charging overhead. For example, housekeeping services could be charged to each ward in a hospital by using square footage as the base or by using patient bed days as the base. Determining a suitable base to use in the allocation process has drawn the most criticism (Chan 1993 and Goldschmidt and Gafni 1990).

Various apportionment methods for allocating overhead costs have been proposed, such as step-down, double distribution, and simultaneous equations (Cleverly 1987 and Goldschmidt and Gafni 1990). Academic accountants agree that where no cause-and-effect relationship exists, allocated overhead should be excluded from a cost finding analysis, particularly if the focus of the analysis is short-term (Finkler 1994). The argument to exclude overhead cost is because a misallocation of costs can result in ridiculous management decisions (Goldschmidt and Gafni 1990).

Nonetheless, identifying the contributing margin of a PL represents the resources available to cover fixed costs and provide for working capital. Thus, as volume increases, there are more patients to share those fixed costs. The average cost per patient decreases as volume increases because fixed costs are spread over a larger number of patients.

Relevant Costs and Range

Relevant costs are those affected by the decision at hand (Finkler 1994). For instance, by eliminating a service a hospital may be able to decrease its labor expenses. Labor, in this case, is considered a relevant cost. Relevant costs are the most important classification of costs examined in this cost finding analysis.

Determining those costs classified as relevant depends on several factors, (1) the cost object, (2) the time period, and (3) controllability. For instance, costs that could be avoided by making certain business decisions, and the opportunity costs associated with a scarce resource are examples of relevant costs. Fixed costs are relevant if they are affected by the decision. Costs incurred in the past, which cannot be recovered, are referred to as sunk costs. Sunk costs are generally an irrelevant cost (Holmes 1996).

The relevant range is the expected range of volume over which fixed costs are fixed and variable costs vary in direct proportion. It is important when discussing or identifying relevant costs that some reference be made to the relevant range. In the long-run, most costs are considered relevant. In developing long-range policies involving pricing decisions, full-costs would be considered relevant.

Opportunity Costs

Important to any financial analysis is the concept of opportunity costs, which refers to a benefit lost or forgone due to the manner in which resources are used (Gapenski 1993). If a financial analysis involves any resource considered to be "scarce," then opportunity costs should be estimated. In many hospitals, particularly in NFP hospitals, most resources considered in a financial analysis would be classified as scarce. Examples include equipment, labor and space. Obviously, if a hospital has excess capacity due to a continually low census, then certain resources would not be considered scarce.

Cost Finding Approaches

Defining the PL is easier than defining the costs associated with that PL. There are three major costs associated with producing a good or service, (1) direct material, (2) direct labor, and (3) overhead. As already alluded to, determining and assigning overhead costs is where traditional cost accounting has been criticized because of the arbitrary methods used to allocate certain costs, in which no cause-and-effect situation exists (O'Guinn 1991).

The literature suggests that traditional cost accounting, which determines full-cost-per-service unit, is incapable of providing managers with relevant cost information. Traditional cost accounting involves: (1) tracing direct costs to cost objects, (2) allocating and reallocating costs from one cost object to another, and (3) allocating indirect costs to products or services (Chan 1993). Although

assigning full-cost to a product or service is a cost finding approach, other approaches exist.

Job order costing, process costing and activity-based costing (ABC) are three approaches to cost finding. Job order costing is used when the product or service being produced is unique and consumes different amounts of inputs. Applied to healthcare, job order costing would involve itemizing every resource used to treat a particular patient. For example, job order costing would be used for determining the costs associated with surgery, since organ transplants consume many more resources than arthroscopic knee surgeries. There is a great deal of information accumulated for each job; therefore, this method is used where the dollar value of each product warrants the extra work (Pelfrey 1995).

Process costing involves tracing costs to a work center, department, or PL. Process costing is an approach that assumes a product or service consumes approximately the same amount of resources to produce. This approach is relatively inexpensive, when compared to job-order costing. Process costing would be appropriate for determining the costs of providing standardized physical exams. In the manufacturing sector, this method is used for relatively low-cost goods or multiple, homogenous goods (Pelfrey 1995). Process costing is also used in organizations where practicality prohibits maintaining cost records for each item produced.

Activity-based costing, or ABC, is a development in product costing that has attracted much attention. Where traditional approaches trace costs to units of a particular product, ABC focuses on activities as the fundamental cost objects and

uses the costs of these activities as building blocks for compiling the costs of other cost objects (O'Guin 1991). ABC uses cost drivers, which are the bases of allocating costs (Chan 1993). The approach improves the accuracy of costing PLs by more accurately assigning overhead costs based on a cause-and-effect relationship.

Designing an ABC system involves: (1) aggregating actions into activities, (2) reporting the cost of activities, (3) identifying activity centers, (4) selecting first-stage cost drivers, and (5) selecting second-stage cost drivers (Chan 1993). The reported cost of a product using ABC equals the sum of the costs of all activities performed to manufacture and deliver the product. Despite the contributions of ABC, economic as well as technical feasibility have limited its implementation within healthcare organizations.

No matter which costing approach is used, there will invariably be some averaging of costs and arbitrary assignment of joint costs. The complexities of the organization, the availability of resources, and the availability of expertise determine how an organization traces its costs. Most healthcare organizations use a variety of approaches, which may or may not conform to the rules of any specific approach cited above.

The literature suggests that certain "hybrid" or modified approaches could provide healthcare administrators with cost information that could be used to make sound management decisions (Holmes 1996). Many of these approaches are simply improvements upon traditional cost accounting approaches. Although

the literature was rich with discussion of cost finding approaches and theoretical applications, it lacked "real life" examples.

Cost Accounting Systems

Imperative to any financial analysis or cost finding exercise is a source of valid and reliable data. The presence of some sort of accounting system (cost-finding or charge-capturing system) in healthcare organizations is imperative, given today's reimbursement methodologies and competitive environment. However, the quality of these accounting systems varies, particularly in NFP and governmental hospitals and healthcare organizations (Holmes and Schroeder 1996).

Doubts have been raised in the literature regarding the adequacy of modern information systems in monitoring and managing PLs (Nemes 1990). The doubts stem mainly from past accounting practices, caused by legislation and policy decisions. For instance, prior to 1983, Medicare legislation emphasized cost centers and cost-based reimbursement and encouraged a functional configuration. With the arrival of prospective payment and DRGs, there was a shift in focus from payments calculated on allocated costs incurred by functional department to a system based on payment for specific diagnostic categories.

Remnants of past accounting practices persist due to rules established by the Health Care Finance Administration (HCFA) in developing Medicare cost reports. Therefore, accounting systems in many hospitals are configured to support management decisions of the past. However, Finkler (1994) writes:

> It is difficult for any one system to serve the conflicting needs of allocating costs for external reporting, determining incremental costs for negotiating and decision making, and determining product costs for productivity measurement and cost control.

Collecting accurate cost information is expensive. There are two general kinds of costs associated with any cost system: (1) the costs of measurement, and (2) the costs of errors (Chan 1993). Realizing this, the goal is to balance the costliness of accurate data, with the need for accuracy and relevancy.

Scope of Cost Finding Analyses

The scope of any cost finding analysis consists of two components, physical boundaries and time. The physical boundary involves asking, "Whose resources are we interested in conserving?" The time element of scope refers to asking, "How far into the future should costs be analyzed?" Answering these two questions must come before any cost information is collected.

Holmes (1996) discussed how to undertake a financial analysis by first asking, "What is the scope of the analysis?" For instance, should a financial analysis help save money for a department in a hospital, yet overall cost the hospital more money? Or should the financial implications be extended to the hospital, the local community served, or society as a whole? In reality, certain authors insist that there are limits to the scope of most financial analyses, since we have not yet derived a practical way to measure a social welfare function (Finkler 1994).

The time function is also important. Time (short-term versus long-term) influences whether costs are avoidable, unavoidable, fixed, variable, or relevant, to name a few. If a decision period focuses on the near future, certain costs may be unavoidable, such as the mortgage payment of the facilities. However, in the long-run a decision could be made to sell the building, making the mortgage payment avoidable. Also, most all costs are variable in the long-run. For example, labor cost incurred from salaried workers are fixed in the short-term, but these workers can be eliminated if the organization downsizes. Finally, all costs are relevant in making long-range strategic decisions, since vast changes, or even complete elimination of the organization, are possible.

METHODOLOGY

Identifying the cost object, relevant direct and indirect costs, supporting services and revenues by payer was the general approach of this analysis. PLs represent an amalgamation of patients in a way that makes business sense (Cleverly 1994). Therefore, the cost object used in this analysis was the entire Maternity PL.

The Maternity PL was defined as a cluster of 12 DRGs. DRGs were an easy way to define the Maternity PL, since they are predicated on the assumption that they classify patients with similar patterns of consumption of hospital services, including nursing care and medical treatment. Costs and revenues were further traced to the DRG level within the PL. Table 1 identifies the DRG clusters.

Table 1. Product Line Description.

Maternity DRG	Description
370	Cesarean section w complications.
371	Cesarean section w/o complications.
372	Vaginal delivery w complicating diagnoses.
373	Vaginal delivery w/o complicating diagnoses.
374	Vaginal delivery w sterilization and/or D&C.
375	Vaginal delivery w O.R. procedure, except sterilization and/or D&C.
379	Threatened abortion.
380	Abortion w/o D&C.
381	Abortion w D&C, aspiration curettage or hysterectomy.
382	False labor.
383	Other antepartum diagnoses w medical complications.
384	Other antepartum diagnoses w/o medical complications.

Source: Federal Register, Vol. 61, No. 202

Maternity Product Line

The Maternity PL, which is delivered through Newport Hospital's newly renovated Birthing Center (12 birthing rooms/beds), includes prenatal, labor and delivery, and postpartum care. The PL was designed to be a full service, "one stop shopping" for pregnant women. The concept of a Birthing Center focuses extensively on education and prevention, before the delivery.

A Birthing Center differs from traditional methods of delivery by its comprehensive focus. A woman undergoes labor, delivery, and stays in the same room with her new child for the entire admission. An operating room is located in the Birthing Center for emergency or planned cesarean sections.

Although this analysis did not focus on the cost effectiveness of Birthing Centers, studies have indicated they are more cost-effective than traditional methods for low-risk labor and delivery (Spitzer 1995 and Stone and Walker 1995). One study (Stone and Walker 1995) suggests Birthing Centers had as much as a 48 percent lower average cost per delivery.

Birthing Centers are said to be more cost effective because of their "appropriate use of technology and professional skill levels (Dickinson et al. 1994)." At the same time, studies (Spitzer 1995) suggest that Birthing Center care is at least as safe as in-hospital delivery. Table 2 identifies the workload for the PL over the last four years.

Table 2. Maternity PL Workload.

	Year			
	1993	1994	1995	1996
Inpatient Days	3246	2635	1911	1828
Admissions	1161	1024	883	816
Length of Stay (days)	2.80	2.57	2.16	2.24
Percent Occupancy	55.4%	54.2%	32.7%	42.0%

Source: Newport Hospital's Workload Report, dated October 1996.

Cost Finding

To answer the research questions, this financial analysis focused on those costs that were predominately variable and controllable by the PL's management. Since the decision at hand was not how to set pricing policies, and is focused on the next five years, full-cost information was irrelevant. Therefore, the second step of this cost finding analysis involved identifying those costs that were relevant.

The entire cost finding analysis resembles the traditional step down approach, with certain modifications. As discussed above, recent literature suggested improvements to traditional cost finding by (1) separating fixed and variable costs into separate cost pools, and (2) selecting allocation bases that are as close as possible to being cost drivers for the cost pools.

Identifying direct and indirect costs was undertaken by reviewing the hospital's cost reports (not to be confused with the Medicare Cost Report). Direct costs identified excluded any allocated overhead. Indirect costs were found by identifying those cost centers that supported the PL. Irrelevant fixed costs and

unavoidable costs such as allocated overhead and sunk costs were excluded from the analysis, since they would cloud and distort the evaluation of the PL.

The relevant direct and indirect costs were traced to the Maternity PL through Newport's cost accounting system. Accounting data from fiscal year 1996 was used in this analysis. The percentage of costs that were variable in each cost pool was established through direct observation and expert opinion. Although attempts were made to base all financial data on empirical observations, at times it became necessary to accept expert opinion to ensure certain costs were properly allocated, especially in the case of joint costs.

Direct Cost

Direct cost information was obtained by using the hospital's Responsibility Summary Report. This report identifies those costs that could be directly traced to the PL. However, within the PL the costs were considered indirect to each DRG, since there was no mechanism to trace the costs to individual patients. Instead of aggregating the cost data by the overall PL, four methods were used to trace costs to individual DRGs.

The first method was to use length of stay (LOS) to distribute direct costs to each DRG. Using this methodology, the variable costs in each cost pool were divided by the total number of inpatient bed-days. This per day cost was then multiplied by the total bed-days in each DRG. The supply, equipment and dietary cost pools were distributed using this methodology. Supplies and drugs made-up the largest portion of expenses identified as direct costs to the PL.

As stated above, overhead and sunk costs were considered irrelevant to this analysis. However, since the scope of the analysis was five years, equipment maintenance, repair and replacement did enter into the analysis as a relevant cost. The reason it was considered relevant was that in five years certain pieces of equipment would need replaced, either due to obsolescence or usage. The purchase/maintenance of equipment cost pool was used as a proxy for the usual "wear and tear" on equipment caused by patient usage.

The second method used to distribute the direct costs of the PL to each DRG involved using the DRG weight. The total number of DRG weights was divided by the variable direct costs of each cost pool to derive a per unit cost. This per unit cost was multiplied by the total number of weighted units in each DRG. This method seemed most appropriate for cost pools such as labor, since DRG weights are based primarily on the labor intensity of different patients, rather than their supply use.

Only eleven percent of the labor cost pool was considered relevant, since volume changes affect only four types of personnel. One registered nurse (RN), one licensed practical nurse (LPN), one certified nurse assistant (CAN) and one operating room technician are affected by fluctuations in patient census. Determining that only eleven percent of the labor cost pool was relevant was done by using average salary figures, plus benefits.

The third method involved using the number of discharges to distribute costs such as medical gas (O^2), forms and office supplies. The total number of discharges was divided by the dollar value of each cost pool to derive a per

discharge cost. This per discharge cost was multiplied by the number of discharges in each DRG. This method was used for cost pools such as office supplies, since the majority of these supplies are used during the admission and discharge process. Also, medical gas is used predominantly during the initial portion of a hospital stay and not throughout the admission.

Of the 12 DRGs that make-up the PL, DRGs 370-375 involve the delivery of a child. The other six are complications during the course of a pregnancy or other obstetrical/gynecological conditions. Therefore, cost pools that were related to the delivery of a child, such as hearing screens, were distributed only to the delivery DRGs.

Appendix A identifies all direct costs for the PL. The Appendix identifies the name of each cost pool, total costs associated with each cost pool and whether the cost pool is relevant to the analysis. The percentage of costs considered relevant to the analysis and the distribution method used to allocate costs to each DRG are also shown.

Indirect Costs

After clearly identifying the cost object and the direct costs associated with the PL, the next step was to identify relevant indirect costs. Indirect costs were obtained using Newport Hospital's Cost Grouping Report. Indirect costs were those that could not be directly traced to the PL, but would be affected by volume changes.

Since there was no traceable relationship between indirect costs and the PL, appropriate cost drivers were needed to accurately distribute indirect costs to each DRG. The cost driver statistics used were mostly workload based. For instance, workload statistics for supporting services such as computerized tomography (CT), dietary, laboratory, laundry, pharmacy, radiology, respiratory, and ultrasound were traced to the DRG level. Other cost driver statistics were developed that provided reasonable means to distribute the costs of each relevant cost pool. Appendix B identifies the cost driver statistics used to distribute indirect costs. Table 3 lists the types of cost drivers used.

Table 3. Indirect Cost Driver Statistics

Driver	Cost Pool	Driving Units
A	Discharges	patients
B	CT scan	procedures
C	Dietary	meals
D	Housekeeping	square feet
E	Inpatient days	days
F	Laboratory	procedures
G	Laundry	pounds
H	Pharmacy	prescriptions
I	Radiology	procedures
J	Respiratory	procedures
K	Surgical cases	patients
L	Ultrasound	procedures

The approach used to distribute indirect costs was similar to the one used to distribute direct costs. First, the relevant costs in each cost pool were divided by total service units, to derive a per unit cost. This per unit cost was multiplied by the total service units consumed by a particular class of patients. Determining the

percentage of the costs considered variable in each cost pool was done through direct observation and expert opinion.

A limitation of distributing certain indirect costs was that all service units were counted equally. For example, all laboratory tests, prescriptions and radiology procedures were assigned the same cost, regardless of the vast differences in resource consumption. This generalization was necessary since Newport Hospital did not use relative value units (RVUs) or weighted workload reporting. However, considering that in 1996 the PL had an average DRG weight of .50, the patients treated by the PL generally require fewer resources than the average patient treated by the hospital. Therefore, the indirect costs attributed to the PL may be slightly overstated.

Aside from some additional nursing staff in the Birthing Center and a partial FTE Operating Room nurse/technician, all ancillary areas (e.g., laboratory, radiology and pharmacy) had excess capacity and would not require additional personnel if the Birthing Center's workload increased by as much as a third. Also, based on observation and expert opinion, supplies within the Birthing Center were considered ninety-five percent variable. An assumption was made that this same variability would be fairly consistent throughout all cost and revenue centers.

As noted above, since the period of analysis was five years, some consideration had to be given to the "wear and tear" on medical equipment. Therefore, a portion of the equipment depreciation cost pool (although not a true cash flow account) was used as a proxy for equipment replacement.

Appendix C lists the indirect costs associated with the PL. The name of the cost pool and the total dollar value of each cost pool are listed. The relevancy of each cost pool, the percentage of the costs considered variable, and the cost driver used to distribute the costs to individual DRGs are also listed.

Total Relevant Costs

Direct and indirect costs were then added together to establish the total relevant costs within the PL. The total relevant costs were computed both in the aggregate and incrementally, for each DRG within the Maternity PL for fiscal year 1996. All cost information was derived using fiscal year 1996 data.

Revenues and Payer Mix

Imperative in today's healthcare finance arena is the ability to accurately explain the source and adequacy of operating revenues. Therefore, following cost finding, the next methodology employed was an analysis of the payer mix. Tracing revenues to individual DRGs was done through one of Newport Hospital's accounting reports that listed total revenues, by payer, within each DRG. However, this report only revealed charges and not the actual payment received from each third party payer. This created a problem.

Newport Hospital rarely receives payments for the full amount of charges. And, since one of the purposes of this cost finding analysis was to identify those payers that had the highest contributing margin, additional work had to be done. Therefore, the agreements, contracts and fee schedules of every third party payer

were reviewed to determine the amount actually paid for each DRG. However, since there were numerous types of Health Maintenance Organizations (HMOs) and Blue Cross plans, an average rate was computed to compare reimbursement rates.

The revenues received from each third party payer were computed both in the aggregate and incrementally. An overall percentage of charges that Newport Hospital received from all payers was also computed.

Contributing Margin

The overall reimbursement within each DRG was then compared to the estimated marginal cost to produce each DRG. Finally, the difference between reimbursement within DRG and the cost to produce the DRG was established. Since costs were traced to the DRG level and not to individual patients, all dollar values represent an average patient within a particular DRG.

The overall contributing margin was identified. The contributing margin identifies the percentage of the payments received from the various third party payers that was above and beyond the relevant cost to produce each DRG.

Analysis of Cash Flows

Following cost finding and the analysis of the payer mix, the next methodology employed was an analysis of cash flows. Appendix F was developed using fiscal year 1996 data to project future year financial implications. As mentioned above, the decision period or period of analysis was five years,

beginning fiscal year (1 October to 31 September) 1997 and ending fiscal year 2001. Cost data was properly inflated using the "Hospital (General medical and surgical hospitals)" component of the Consumer Price Index (CPI), which was 2.7 percent.

Revenues were adjusted for inflation using a different rate. Since there was no consistency among third party payers as to annual increases in their payments, expert opinion was needed to properly adjust the cash flows. The Accounting section at Newport Hospital felt that third party revenues increased by three percent between 1996 and 1997.

Validity and Reliability of the Data

The source of the cost data was the computerized accounting system that has been in place at Newport Hospital for thirteen years. Although the system is primarily geared toward "cost recovery," careful attention was paid during this analysis to purify and obtain only those costs relevant to answer the research question.

Content and construct validity was established by thoroughly evaluating the methodologies employed by previous researchers, as evidenced by the literature review, and the use of expert opinion, particularly during the cost finding portion of the analysis. Reliability of the data can be inferred from the numerous independent audits performed on Newport Hospital's cost reports. These reoccurring audits are performed by government agencies and private accounting

firms. The periodic audits are a requirement by certain third party payers such as Medicare and Medicaid.

RESULTS

The number of Maternity discharges during fiscal year 1996 was 801, which was fourteen percent of Newport Hospital's total discharges. There were 530 patients discharged under DRG 373 (Vaginal delivery without complications), which was more than the other eleven DRGs combined.

The number of inpatient days for the PL was 1,754, which was six percent of the Hospital's total bed days. The PL's average LOS was inline with the geometric LOS, as described by the Healthcare Finance Administration (HCFA), with only a five percent difference. Newport Hospital's Birthing Center had an average LOS of 2.19. The geometric LOS for the same patient mix was 2.08. The average DRG weight for the Maternity PL was .50. Newport Hospital's average DRG weight was close to one.

Of the $1,355,200 classified as direct costs, $285,173 (21 percent) were considered relevant to this analysis. Overall, direct costs accounted for 61 percent of costs within the PL. Medical supplies made-up the majority of the relevant direct costs, totaling $154,126. The salaries and wages of those positions affected by changes in volume accounted for $122,712 of the relevant direct costs.

The DRGs with the highest direct cost were, understandably, those that involved operating room procedures. DRGs 370 and 371 had direct costs of $736

and $548 per discharge, respectively. The DRG with the lowest direct cost was DRG 380 (abortion w/o D&C). See Appendix A.

The cost driver statistics listed in Table 4 were derived to distribute relevant indirect costs. Table 4 reveals the percentage of overall service units consumed, or attributable, to the Maternity PL. Overall, the Maternity PL accounted for a limited amount of hospital-wide cost driver statistics. Although considered relevant to the analysis, services such as CT, radiology and respiratory therapy had little affect on the indirect costs of the PL. See Appendix B.

Table 4. Service Units Consumed

Driver	Cost Pool	Percentage
A	Discharges	13.7%
B	CT Scan	0.1%
C	Dietary	5.8%
D	Housekeeping	4.7%
E	Inpatient Days	5.9%
F	Laboratory	1.4%
G	Laundry	10.2%
H	Pharmacy	1.0%
I	Radiology	0.1%
J	Respiratory	0.9%
K	Surgical Cases	2.4%
L	Ultrasound	2.7%

Source: Newport Hospital's Statistical Budget, Fiscal Year 1996.

Indirect costs made up 39 percent of the overall relevant costs within the PL in fiscal year 1996. Of the $38,010,833 classified by Newport's accounting system as indirect costs, only $111,042 were considered relevant to the analysis. Dietary, equipment depreciation and administration/general had the highest amount of relevant indirect costs. As noted previously, a portion of equipment

depreciation was used as a proxy for future equipment replacement. The administration/general cost pool was actually a combination of several cost centers. However, only the patient accounts and registration cost pools were considered relevant.

The DRGs with the highest indirect cost were the same as the ones that accounted for the most direct costs. DRGs 370 and 371 had $269 and $202 in indirect costs, respectively, for the average patient discharged. See Appendix C.

The total relevant costs traced to the Maternity PL was $396,216 for fiscal year 1996. The incremental costs for each DRG ranged from $329 to $1,005. The average relevant cost for a patient discharged by the Maternity PL was $495. See Appendix D.

Newport Hospital received $1,694,845 for patients discharged from its Birthing Center in fiscal year 1996. Third party payers had a variety of methods to compute payments, such as percent of charges, per diem (per day), and maximum allowable per DRG. HMOs accounted for 50 percent, and Blue Cross accounted for 20 percent of the Birthing Center's total revenues. Combined, Medicare, Medicaid and self-pay patients accounted for only five percent of the revenues.

The average payment received for patient under each DRG ranged from $634 to $3,925. Patients discharged under DRG 373 accounted for the vast majority of the Birthing Center's revenues, primarily because of the number of patients classified under the DRG.

Although accounting for little of the overall revenues, commercial insurance and self pay patients paid the highest amount per discharge, usually 100 percent of charges. Blue Cross, which pays on a per diem basis and the HMOs, which have a maximum allowable per discharge, had relatively high payment rates. The payer classified as the "Partnership" consistently had the lowest payment rates of all the third party payers for all the delivery DRGs (370-375). Blue Cross had the lowest payment rates for most of the remaining DRGs. Cost and revenue data were hard to interpret for DRGs 375, 381 and 382 since there was only one patient discharged under each.

Overall, the Birthing Center collected 54 percent of its charges. The percentage of charges received ranged from 25.3 percent to 100 percent. In general, DRGs involving operating room (OR) procedures had a higher percent of charges collected, particularly from non-governmental third party payers.

Certain revenues from CHAMPUS were not included in the analysis. CHAMPUS pays approximately $100,000 annually to Newport Hospital for capital expenditures. Since this represented less than one-half of one percent of net operating revenues, no attempt was made to trace this revenue to the Maternity PL. See Appendix E for a detailed breakdown of revenues by DRG and third party payer.

Appendix F reveals each payer's contributing margin and an analysis of cash flows. The contributing margins, or the amount collected from each payer above and beyond the relevant cost to provide the care, ranged from 38 percent to 88 percent. The delivery DRGs had an average contributing margin of 75 percent

among all third party payers. The non-delivery DRGs had an average contributing margin of 66 percent. Not only did DRGs 371 and 373 have the highest number of discharges, they also had the highest contributing margin. DRGs 371 and 373 had a 76 percent and 77 percent contributing margin, respectively. Conversely, DRGs 379 and 383 had the lowest contributing margin, 65 percent and 62 percent, respectively.

Commercial payers had the highest contributing margin -- 82 percent, followed closely by the HMOs, which had an average contributing margin of 79 percent. The Partnership had a contributing margin of 61 percent, making it the lowest of the eight classifications of payers.

The analysis of cash flows revealed that, given the current patient mix and revenue structure, the PL will have a contributing margin of $1,338,776 in 1997. By the year 2001, the PL will have a $1,512,117 contributing margin, *ceteris paribus*.

DISCUSSION

The final cost data was significantly lower than expected. However, several possible explanations are offered. First, Newport Hospital has excess capacity. Therefore, the marginal cost of treating additional patients is rather low because most fixed costs are unaffected. Additionally, as suggested by the literature, Birthing Center's have been found more cost effective than traditional hospital stays. Finally, since the period of the analysis was only five years, facility costs and most overhead expenses did not enter into the analysis.

Although this analysis categorized most allocated indirect costs (overhead) as "irrelevant" to the decision at hand, the leaders of Newport must obviously be concerned with the long run viability of the organization. This is especially true given estimates that place allocated indirect costs at 50 percent of the overall cost of the organization (Goldschmidt and Gafni 1990, Cleverly 1987). However, this analysis provides information about the performance of a single PL, not an entire hospital.

While the total cost of caring for individual patients is needed for measuring financial performance, it does not help PL managers in controlling costs or in forecasting the additional costs incurred by incremental volume changes. A PL manager cannot be given a "Responsibility Summary Report" and be expected to make sound business decisions, given that the majority of the costs listed in the report are beyond the manager's control. This analysis was designed to help the PL manager better understand the costs and revenues associated with the Birthing Center.

The analysis describes the amount of revenues that exceeded relevant costs, which can be applied toward the hospital's overhead costs. The majority of the costs considered in this analysis are within the control of the PL manager and/or the PL's individual providers. This cost information can be used by the PL manager and the hospital's leadership to make decisions in which full-cost data does not apply.

PL managers and the hospital's leadership must know how much it costs to care for patients before negotiating discounts. Offering excessively high discounts could cause the facility to fall short of covering the variable costs associated with treating certain patients. Offering discounts that are too low may cause the organization to lose certain payers, particularly managed care groups, who are highly price sensitive. This analysis should not be used to arrive at a "bottom-line" number during negotiations, but can be used to guide contract negotiations and in developing the PL's yearly budget.

A significant peripheral observation was noted during this analysis. Newport's accounting system would have been more appropriate or useful before the implementation of prospective payment methodologies, since reimbursement was often based on cost. Although still useful in justifying reimbursement from certain payers and for establishing pricing policies, Newport's system is not designed to support most management decisions, particularly in the short run. There exists an opportunity to improve management decision-making by designing, modifying or redesigning an accounting system that provides managers

with relevant cost information. Of course, the cost of such a system must be balanced with the expected benefits.

Finally, an opportunity exists to build upon this financial analysis. A study by Manheim and Feinglass (1994) found that profitability by payer was greatly influenced by the costliness of attending physicians. Although no effort was made to differentiate costs within the PL by attending physician, future studies could be undertaken to improve upon this analysis.

RECOMMENDATIONS

The information provided by this analysis will facilitate dialogue between the providers and the leadership of Newport Hospital. Knowing about costs and revenues of the Birthing Center alone will encourage the necessary actions be taken to increase the efficiency and effectiveness of the PL. However, there are five specific recommendations resulting from this analysis.

First, findings of this analysis should be made available to all providers. Studies suggest that healthcare organizations that provide physicians with cost information can reduce resource utilization and control costs more effectively than organizations that do not provide such information (Awasthi and Eldenburg 1996).

The second recommendation involves improving current information management systems. Dramatic improvements are needed in the area of cost accounting. Without accurate and timely cost information, managers are unable to plan and control the operations of the organization. At the very least,

Newport's cost accounting system should be able to separate variable and fixed costs that are combined to create a PL. Ideally, the hospital should be able to compute the amount they can charge for a particular class of patients and still make money (Nemes 1990). A costing system that includes these characteristics provides pertinent information for short-term and long-term decision making and empowers PL managers.

Case-mix management involves treating patients in the most cost effective manner by identifying "best practices." Therefore, it is recommended that initiatives be considered in performing economic studies of case histories, developing critical paths, and performing physician profiling (Tong and Jones 1990).

The forth recommendation involves marketing efforts. Although the marketing and financial functions are distinctly different, it is recommended that Newport's Marketing Director be informed of the results of this analysis. The Marketing Director should evaluate the likelihood of modifying the payer mix by attracting a greater number of profitable third party payers, and/or specific classes (DRGs) of patients. Duboff (1992) writes about the importance of attracting and nurturing profitable customers. The Marketing Department must increase public awareness of profitable portions of the PL and evaluate the sources of patient referrals, to identify and influence the gatekeepers of the patients of Newport County (McCormick 1991).

The fifth recommendation involves evaluating the Birthing Center's capacity. In fiscal year 1996, the Birthing Center's average occupancy rate was 42 percent.

Recent studies indicate that, ceteris paribus, the cost of an empty hospital bed is approximately $42,000. The same study also found that by increasing occupancy rates by one percent would produce a .25 percent decrease in hospital costs (Gaynor and Anderson 1995). Therefore, it is recommended that an evaluation of the Birthing Center's capacity be undertaken, to match patient demand with available resources.

Finally, it is strongly recommended that the Birthing Center, or its PL manager, develop a Business Plan. The Business Plan should include a set of strategic goals and objectives, operating proposals and, forecasts of future demand, revenues and costs. Subject matter experts in planning, marketing, and finance should be involved in developing the plan.

SUMMARY

Quantifying healthcare operations and management decisions is imperative in today's turbulent environment. The shift from traditional cost-based reimbursement to prospective payment methodologies has increased the importance of understanding the cost of operations and the implications of management decisions. As a result, managers must understand cost accounting and the different types of costs associated with a PL.

It is hoped that this analysis contributes to a better understanding of the Birthing Center and, in a small way, facilitate Newport Hospital in realizing its vision of ". . . creating a measurably healthier Newport County, while providing high quality, cost-effective, customer-focused healthcare services."

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FY 1996					Departmental Direct Costs - Maternity PL												
DRG					370	371	372	373	374	375	379	380	381	382	383	384	Total
Discharges					37	103	71	530	6	1	27	4	1	1	10	10	801
DRG Weight					1.02	0.80	0.55	0.40	0.69	0.88	0.55	0.42	0.56	0.23	0.38	0.54	
Total Weights					37.68	82.07	38.86	211.42	4.15	0.88	14.77	1.67	0.56	0.23	3.82	5.41	401.5
Geometric LOS					4.2	3.1	2.3	1.6	2	2.5	3.6	1.6	1.6	1.4	2.7	3	
Actual LOS					4.8	3.3	2.4	1.8	2.2	1.0	2.9	1.0	1.0	2.0	1.8	2.2	
Total Days					176.1	340.9	169.7	927.5	13.0	1.0	79.1	4.0	1.0	2.0	18.0	22.0	1754.4
TYPE	COST	REL.	VAR.	Method													TOTAL
Sup/inventory/b	32491	1	95%	LOS	3099	5998	2986	16318	229	18	1392	70	18	35	317	387	30866
Sup/special/b	2123	1	95%	LOS	202	392	195	1066	15	1	91	5	1	2	21	25	2017
Sup/inventory/nb	49596	1	95%	LOS	4730	9156	4557	24909	350	27	2125	107	27	54	483	591	47116
Sup/special/nb	41081	1	95%	LOS	3918	7584	3775	20633	290	22	1760	89	22	44	400	489	39027
Sup/drugs/nb	5936	1	100%	LOS	596	1154	574	3138	44	3	268	14	3	7	61	74	5936
Hearing screen	13407	1	20%	Dis.	133	369	255	1900	22	4	0	0	0	0	0	0	2681
Medical gas	821	1	100%	Dis.	38	106	73	543	6	1	28	4	1	1	10	10	821
IV solutions/sets	26608	1	100%	Wgt.	2497	5439	2575	14010	275	58	979	111	37	15	253	358	26608
Sutures	1569	1	100%	Wgt.	158	343	163	884	17	4	0	0	0	0	0	0	1569
Surgical inst.	829	1	20%	Wgt.	16	34	16	87	2	0	6	1	0	0	2	2	166
Forms	3773	1	100%	Dis.	174	485	334	2496	28	5	127	19	5	5	47	47	3773
Office supplies	2892	1	20%	Dis.	27	74	51	383	4	1	19	3	1	1	7	7	578
Continuing ed.	875	0															
Books/subscript.	711	0															
Travel	199	0															
Telephone ser.	736	0															
Prev/maint. contr.	418	0															
Purch/maint. equip.	936	1	75%	LOS	70	136	68	371	5	0	32	2	0	1	7	9	702
Dietary transfers	600	1	100%	LOS	60	117	58	317	4	0	27	1	0	1	6	8	600
Miscellaneous	910	0															
Salaries/wages	1168689	1	11%	Wgt.	11516	25082	11876	64613	1269	268	4515	512	170	69	1169	1653	122712
TOTAL:	$1,355,200				$27,233	$ 56,470	$ 27,555	$ 151,671	$ 2,560	$ 412	$11,369	$ 937	$ 286	$ 235	$2,784	$ 3,661	$ 285,173
PER DISCHARGE:					$ 736	$ 548	$ 388	$ 286	$ 427	$ 412	$ 421	$ 234	$ 286	$ 235	$ 278	$ 366	

FY 1996				COST DRIVER STATISTICS - MATERNITY PRODUCT LINE													
Driver	Cost Pool	Total Basis	Maternity	Units	370	371	372	373	374	375	379	380	381	382	383	384
A	Discharges	5856	801	Patients	37	103	71	530	6	1	27	4	1	1	10	10
B	CT Scan	4514	4	Procedures	0	2	2	0	0	0	0	0	0	0	0	0
C	Dietary	86439	5019	Meals	504	975	485	2653	37	3	226	11	3	6	51	63
D	Housekeeping	338621	16037	Square feet	1610	3117	1551	8478	119	9	723	37	9	18	165	201
E	Inpatient Days	29537	1754	Days	176	341	170	928	13	1	79	4	1	2	18	22
F	Laboratory	288188	3982	Procedures	306	526	424	2385	30	3	138	29	11	4	68	58
G	Laundry	617820	62904	Pounds	6315	12224	6084	33256	467	36	2837	143	36	72	645	789
H	Pharmacy	279584	2797	Prescriptions	164	444	257	1785	24	3	71	13	6	2	21	7
I	Radiology	33662	36	Procedures	16	9	6	5	0	0	0	0	0	0	0	0
J	Respiratory	37547	341	Procedures	38	78	38	181	2	0	4	0	0	0	0	0
K	Surgical Cases	5883	142	Patients	37	103	0	0	0	1	0	0	1	0	0	0
L	Ultrasound	4191	113	Procedures	15	10	7	18	0	0	41	0	0	0	5	17

FY 1996							INDIRECT COSTS - MATERNITY PRODUCT LINE											
DRG							370	371	372	373	374	375	379	380	381	382	383	384
Discharges							37	103	71	530	6	1	27	4	1	1	10	10
DRG Weight							1.02	0.80	0.55	0.40	0.69	0.88	0.55	0.42	0.56	0.23	0.38	0.54
Total Weights							37.7	82.1	38.9	211.4	4.2	0.9	14.8	1.7	0.6	0.2	3.8	5.4
Geometric LOS							4.2	3.1	2.3	1.6	2	2.5	3.6	1.6	1.6	1.4	2.7	3
Actual LOS							4.8	3.3	2.4	1.8	2.2	1.0	2.9	1.0	1.0	2.0	1.8	2.2
Total Days							176.1	340.9	169.7	927.5	13.0	1.0	79.1	4.0	1.0	2.0	18.0	22.0
TYPE	COST	REL.	INDIRECT	VAR.	TOTAL	DRIVER												
Admin & gen.	9,114,930	1	1,157,536	10%	16,182	A	748	2081	1434	10708	121	20	545	81	20	20	202	202
Building depr.	1,175,883	0																
Cafeteria	55,962	0																
Central service	409,893	1	409,893	27%	2,649	K	690	1,921	-	-	-	19	-	-	19	-	-	-
CT scan	360,930	1	360,930	50%	161	B	-	81	81	-	-	-	-	-	-	-	-	-
Dietary	1,436,337	1	1,427,623	43%	35,718	C	3,586	6,941	3,455	18,884	265	20	1,611	81	20	41	366	448
EEG	39,093	0																
Emergency	2,776,819	0																
Employee H&W	5,202,373	0																
Equipment depr.	1,480,336	1	32,727	75%	24,545	E	2,464	4,770	2,374	12,976	182	14	1,107	56	14	28	252	308
Housekeeping	1,028,275	1	1,028,275	5%	2,269	D	228	441	219	1,200	17	1	102	5	1	3	23	28
Intensive care	1,077,359	0																
Laboratory	3,080,755	1	2,774,931	32%	12,259	F	942	1,619	1,305	7,342	92	9	425	89	34	12	209	179
Laundry & linen	175,833	1	175,833	16%	2,946	G	296	572	285	1,557	22	2	133	7	2	3	30	37
Maint & repair	209,629	0																
Medical records	673,567	1	673,567	1%	549	E	55	107	53	290	4	0	25	1	0	1	6	7
MRI	353,184	0																
Nuclear med	429,007	0																
Nursing admin.	754,321	0																
Occ. health	1,307,752	0																
Oper of plant	2,075,336	0																
Operating room	3,911,624	0																
Other rev. centers	4,930,709	0																
Pharmacy	2,154,649	1	2,154,649	59%	12,622	H	740	2,004	1,160	8,055	108	14	320	59	27	9	95	32
Phys office	492,720	0																
Physical ther	1,895,745	0																
Psychology	127,544	0																
Radiology	1,357,167	1	1,331,882	17%	243	I	108	61	40	34	-	-	-	-	-	-	-	-
Recovery room	213,964	0																
Rehab sub prov	1,684,511	0																
Respiratory ther	515,483	1	427,054	15%	579	J	65	132	65	307	3	-	7	-	-	-	-	-
Social service	226,484	0																
Speech path	168,370	0																
Ultrasound	210,100	1	210,100	6%	321	L	43	28	20	51	-	-	116	-	-	-	14	48
TOTAL:	$38,010,883				$111,042		$ 9,963	$20,758	$10,491	$61,404	$ 815	$ 99	$4,391	$ 379	$ 137	$ 117	$1,198	$1,288
PER DISCHARGE:							$ 269	$ 202	$ 148	$ 116	$ 136	$ 99	$ 163	$ 95	$ 137	$ 117	$ 120	$ 129

FY 1996	TOTAL COSTS - MATERNITY PRODUCT LINE											
DRG	370	371	372	373	374	375	379	380	381	382	383	384
Discharges	37	103	71	530	6	1	27	4	1	1	10	10
Aggregate Costs:												
Direct Costs	27233	56470	27555	151671	2560	412	11369	937	286	235	2784	3661
Indirect Costs	9963	20758	10491	61404	815	99	4391	379	137	117	1198	1288
Total:	$ 37,196	$ 77,228	$ 38,047	$ 213,075	$ 3,376	$ 511	$ 15,760	$ 1,317	$ 423	$ 352	$ 3,982	$ 4,950
Incremental Costs:												
Direct Costs	736	548	388	286	427	412	421	234	286	235	278	366
Indirect Costs	269	202	148	116	136	99	163	95	137	117	120	129
Total:	$ 1,005	$ 750	$ 536	$ 402	$ 563	$ 511	$ 584	$ 329	$ 423	$ 352	$ 398	$ 495

FY 1996	THE MATERNITY PRODUCT LINE												
DRG	370	371	372	373	374	375	379	380	381	382	383	384	Total
Discharges	37	103	71	530	6	1	27	4	1	1	10	10	801
Geometric LOS	4.2	3.1	2.3	1.6	2	2.5	3.6	1.6	1.6	1.4	2.7	3	
Actual LOS	4.8	3.3	2.4	1.8	2.2	1.0	2.9	1.0	1.0	2.0	1.8	2.2	
TOTAL REVENUES													
Self Pay	-	4,104	-	23,893	-	-	3,918	-	-	-	917	-	32,832
Blue Cross	51,618	92,972	15,949	150,199	1,876	-	1,876	938	-	-	1,876	6,567	323,872
Commercial	5,029	22,616	7,488	82,212	-	-	5,407	-	-	-	-	-	122,752
CHAMPUS	26,887	56,596	7,027	32,807	-	2,919	3,265	1,395	1,855	-	-	3,003	135,753
HMOs	52,868	162,881	90,412	472,211	12,123	-	39,280	-	-	-	8,250	6,976	845,002
Medicare	-	3,099	-	1,633	-	-	-	-	-	-	-	-	4,732
Medicaid	3,452	-	2,733	28,926	-	-	7,236	876	-	-	-	-	43,224
Partnership	5,377	6,468	30,918	133,327	1,844	-	2,612	1,116	-	634	1,980	2,402	186,678
TOTAL:	$ 145,231	$ 348,737	$ 154,526	$ 925,207	$ 15,843	$ 2,919	$ 63,594	$ 4,325	$ 1,855	$ 634	$ 13,024	$ 18,949	**$ 1,694,845**
INCREMENTAL REVENUES													
Self Pay	-	4,104	-	2,655	-	-	1,959	-	-	-	917	-	
Blue Cross	4,301	3,099	1,772	1,502	1,876	-	938	938	-	-	938	2,189	
Commercial	5,029	4,523	2,496	3,426	-	-	2,704	-	-	-	-	-	
CHAMPUS	3,361	2,695	1,757	1,312	-	2,919	1,632	1,395	1,855	-	-	1,502	
HMOs	4,067	3,878	2,825	2,035	3,031	-	3,022	-	-	-	1,650	2,325	
Medicare	-	3,099	-	1,633	-	-	-	-	-	-	-	-	
Medicaid	3,452	-	2,733	2,410	-	-	1,809	876	-	-	-	-	
Partnership	2,689	2,156	1,405	1,050	1,844	-	1,306	1,116	-	634	990	1,201	
Average:	$ 3,925	$ 3,386	$ 2,176	$ 1,746	$ 2,641	$ 2,919	$ 2,355	$ 1,081	$ 1,855	$ 634	$ 1,302	$ 1,895	
PERCENT OF CHARGES													
Self Pay	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Blue Cross	68.4%	69.7%	54.3%	50.0%	66.9%	-	57.3%	35.5%	-	-	54.3%	107.7%	
Commercial	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
CHAMPUS	40.4%	53.8%	56.7%	41.4%	-	126.9%	73.6%	42.1%	31.2%	-	-	89.5%	
HMOs	83.1%	80.0%	70.4%	66.9%	67.8%	-	82.3%	-	-	-	76.1%	87.7%	
Medicare	-	80.4%	-	33.7%	-	-	-	-	-	-	-	-	
Medicaid	76.0%	-	76.0%	76.0%	-	-	76.0%	76.0%	-	-	-	-	
Partnership	34.7%	52.4%	35.3%	33.9%	36.8%	-	58.8%	41.6%	-	41.0%	25.3%	71.6%	

CONTRIBUTING MARGIN												
	370	371	372	373	374	375	379	380	381	382	383	384
Self Pay	--	82%	--	85%	--	--	70%	--	--	--	57%	--
Blue Cross	77%	76%	70%	73%	70%	--	38%	65%	--	--	58%	77%
Commercial	80%	83%	79%	88%	--	--	78%	--	--	--	--	--
CHAMPUS	70%	72%	69%	69%	--	82%	64%	76%	77%	--	--	67%
HMOs	75%	81%	81%	80%	81%	--	81%	--	--	--	76%	79%
Medicare	--	76%	--	75%	--	--	--	--	--	--	--	--
Medicaid	71%	--	80%	83%	--	--	68%	62%	--	--	--	--
Partnership	63%	65%	62%	62%	69%	--	55%	70%	--	45%	60%	59%

ANALYSIS OF CASH FLOWS					
	1997	1998	1999	2000	2001
Maternity Costs	$ (406,914)	$ (417,900)	$ (429,184)	$ (440,772)	$ (452,672)
Maternity Revenues	$ 1,745,690	$ 1,798,061	$ 1,852,002	$ 1,907,563	$ 1,964,789
Totals =	$ 1,338,776	$ 1,380,160	$ 1,422,819	$ 1,466,791	$ 1,512,117
Cost Increase =	2.7%		Revenue Increase =	3.0%	

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LTJG THOMAS C. HUGHES, MSC, USN

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13. ABSTRACT *(Maximum 200 words)*

Since the implementation of prospective payment methodologies, hospitals have seen their revenues dwindle. Many are offering significant discounts to attract price-sensitive buyers. Hospitals are realizing the importance of quantifying operations and management decisions. Cost finding, through cost accounting techniques, is a method hospitals employ to evaulate the adequacy of reimbursement, product line performance, organizational performance, management effectiveness, and future viability. This paper reports the process and findings of a cost finding analysis at a not-for-profit (NFP) hospital's Birthing Center. Two research questions were explored: (1) What are the marginal costs of providing care in the Maternity product line (PL)? and, (2) Which third party payers provide the highest contributing margin? The scope of this analysis was a five year time-frame. The different categories of costs were discussed, as well as cost finding approaches. The adequancy of full-cost information for use by PL managers, especially for short-term decision making, was also explored. The results of this analysis provided information regarding the categories of patients and the types of third party payers that had the highest contributing margin in fiscal year 1996. Recommendations were provided to the leadership of Newport Hospital regarding enhancing marketing efforts, establishing case-mix management practices, improving management information systems, evalauating thehospital's capacity versus current patient demand, and establishing a Business Plan for the Birthing Center.

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